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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,933	07/15/2003	Thorsten Lower	OST-031107	6829
22876	7590	11/01/2004	EXAMINER	
FACTOR & LAKE, LTD 1327 W. WASHINGTON BLVD. SUITE 5G/H CHICAGO, IL 60607			LEYBOURNE, JAMES J	
			ART UNIT	PAPER NUMBER
			2881	

DATE MAILED: 11/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/619,933	LOWER, THORSTEN	
	Examiner	Art Unit	
	James J. Leybourne	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-6, 8-13, 16-22, 24-27 and 29-34 is/are rejected.
- 7) ☒ Claim(s) 2, 7, 14, 15, 23, 28 and 35 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/01/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claim 15 is objected to because of the following informalities: In line 2, "circular" should be "spherically concave" as described in the specification, page 17, line 28.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 18 and 29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 18 is not enabled for slits and/or openings because there would be no signal or the contrast would be very low for a background that scatters very weakly or not at all.

Claim 29 is not enabled for the case where there is only back-scattering and there is no slit or opening.

The following is a quotation of the second paragraph of 35 U.S.C. 112:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. No steps are given. Therefore, it is not clear what steps are necessary to implement the method. Are identical steps used for measuring the intensity profile of a beam measuring an optical system and adjusting an optical system?

4. Claims 2, 6, 8, 10, 19, 24-26, 31 and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961);

Ex parte Hall, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949).

In the present instance:

claim 2 recites the broad recitation "opening", and the claim also recites "a slit or circular hole" which is the narrower statement of the range/limitation.

claims 6 and 24 recites the broad recitation "needle", and the claims also recites "metal needle" and "a heavy metal such as tungsten" which are narrower statements of the range/limitation.

claims 10 and 31 recite the broad recitation "sensor ring", and the claims also recites "a plurality of sensor segment" and "equidistantly around the axis" which are narrower statements of the range/limitation.

claims 19 and 26 recites the broad recitation "material", and the claims also recites "graphite" which is the narrower statement of the range/limitation.

claim 25 recites the broad recitation "ground smooth", and the claim also recites "substantially parallel to the flat surface" which is the narrower statement of the range/limitation.

Claim 34 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite because it is not clear what is meant by the term "substantially punctual".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, 11, 16, 19, 21 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuoka et al. (GB 2132390). Matsuoka et al. disclose a method for correcting focus of an electron beam system that involve the steps of scanning markers marked two dimensionally in at least 3 positions on a substrate, obtaining a back scattered electron intensity curve and obtaining a correction value responsive to the out of focus marks by comparing the intensity curves with the normal in focus curve (Fig. 2 and 8 and page 1, lines 73-90). The back scattering surface is essentially normal to the mean direction of the beam (Fig. 2). As shown in Fig. 6, the back scattering surfaces are in the form of narrow strips. The focusing lens 21 is located upstream of the deflection unit 22.

6. Claims 1, 3, 4, 9, 11, 22 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Kitagawa et al. (USPN 6166380). Kitagawa et al. disclose a method for evaluating the performance of an electron microscope by scanning a pattern 1 with an electron beam 8 and collecting backscattered electrons with detector 15. Several types of test patterns are disclosed including use of a slit 23a having a width that is less than the diameter of the beam, (Fig. 6) on a black (scatters weakly or not at all) background 23b (column 6, lines 1-8). As seen in

Fig. 1, the sample is perpendicular to the mean beam direction and the detector 15 is upstream of the measuring structure 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al. as applied to claim 1 above, in view of Takakuwa (US 2001/0052573). Kitagawa et al. do not teach that the back scattering surface is carried by a raised surface.

In Fig. 3 Takakuwa discloses a target mark unit for use in a device comprising a back-scattering measuring device 160 and detector 60 located upstream of the measuring structure. The measuring device is a raised surface (Fig. 4). The target mark unit is for adjusting the shape of the electron beam and for measuring the shape of the beam (Abstract). It would be obvious to one of ordinary skill in the art to use the measurement method of Kitagawa et al. in an electron beam device using a raised structure as taught by Takakuwa because

Takakuwa teaches this accurately measures the shape of the electron beam and reduces focus adjustment time (Abstract).

8. Claims 12, 13, 17, 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al. as applied to claim 1 above.

Regarding claims 12 and 13, Kitagawa et al. are silent regarding the use of test sites distributed throughout the deflection field of the electron beam device. It is well known in the art that test structures for characterizing and optimizing the performance of an electron beam system can be placed at various locations in the area scanned by the beam. It would be obvious to one of ordinary skill in the art to use structures at varying distances from the center and to arrange them uniformly in the radial and/or circumferential direction because it is well known that distortions, aberrations and the like can vary for different deflection angles.

Regarding claims 17, 20 and 27, Kitagawa et al. do not teach forming an image of a grid pattern in a measuring structure and comparing it to a reference image of the structure or scanning in two dimensions. However, it is well known in the art to use calibration grids for measuring distortions in electron beam devices, and to scan in both X and Y directions.

9. Claims 10, 30-33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanderson et al. (USPN 4794259). in view of Kitagawa et al. as applied to claim 1 above. Sanderson et al. disclose an electron beam welder that uses a detector comprising annular collector elements 28, 29 divided into a

number of circularly and radially spaced segments (FIG. 5. and column 5, lines 43-45).

For generation of electron (grey scale) images, to produce good topographic relief, where the feature being viewed has no particular orientation, the signals can be summed and differenced (column 6, lines 6-9).

Sanderson et al. do not teach the use of a measuring structure as cited in claim 22. It would be obvious to one of ordinary skill in the art to use a test pattern in the device of Sanderson et al. as disclosed by Kitagawa et al. because, as discussed under claim 1 above, it is well known in the art to use test structures comprising backscattering structures for calibration and adjustment of electron beam machines.

With respect to claim 34, the beam passes between an electro-magnetic focusing lens system 8 and electromagnetic deflection coils 9 located downstream of the focusing coil.

Allowable Subject Matter

10. Claims 7, 14, 15, 23, 28 and 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 2, 6, 8 and 25 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claim 2, the prior art fails to teach or fairly suggest a method for measuring the intensity profile of an electron beam using a measuring structure which includes at least one opening which allows the electron beam to pass through.

With respect to claims 6-8 and 25, the prior art fails to teach or fairly suggest a method for measuring the intensity profile of an electron beam using a measuring structure formed by a raised needle.

With respect to claims 14 and 23, the prior art fails to teach or fairly suggest a method for measuring the intensity profile of an electron beam using a measuring structure in which holes and/or back-scattering surfaces are so aligned that their axes or normals pass through the principal point of the optical system.

With respect to claim 15, the prior art fails to teach or fairly suggest a method for measuring the intensity profile of an electron beam using a measuring structure with back-scattering surfaces that are spherical.

With respect to claim 28, the prior art fails to teach or fairly suggest a method for measuring the intensity profile of an electron beam using a measuring structure which includes back-scattering strips forming a grid and additionally includes at least one back-scattering surface in each of the areas delimited by the edges of the grid meshes, located at the centers of the areas delimited by the gridlines.

With respect to claim 35, the prior art fails to teach or fairly suggest an Electron-beam machining device comprising an optical system for an electron beam wherein a focusing lens is located downstream of a beam deflector unit, viewed in the direction of the beam.

Relevant Prior Art

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Giuffre et al. (USPN 5169488) discuss the use of calibration grids for measuring distortions in electron beam devices.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James J. Leybourne whose telephone number is (571) 272-2478. The examiner can normally be reached on M-F 9:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

October 11, 2004
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